



Intergenerational learning: Are children key in spurring climate action?

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ABSTRACT

Complex environmental problems are typically resolved after the public is no longer willing to accept their risks and demands change (i.e., Reflexive Modernization). Notable examples include responses to the ozone hole and acid deposition. In the case of climate change, however, the politicization of the issue can result in adults ignoring the risks and accepting the status quo (i.e., Anti-Reflexivity). Although strategies such as strategic framing have seen some successes, new methods are needed to engage citizens in addressing climate change impacts. We argue that child-based climate communication is an understudied but promising pathway to incite climate action among children and adults alike. Children have unique perspectives on climate change, represent an audience that is easily reached through schools, and are arguably best equipped to navigate the ideologically fraught topic of climate change with older generations in ways that inspire action. We review research to support this novel communication approach and outline best practices for programmatic implementation and associated research.

1. Introduction

Technological solutions to many climate-related challenges exist, but social barriers to climate action stymie the scale of response needed to avoid the worst of projected impacts. Individuals' decisions about reduced meat consumption (Hedén et al., 2014), riding a bicycle for transportation (Peterson et al., 2013), and using energy saving options in the household such as the installation of Energy Star appliances (Jaffe et al., 2001) may mitigate the effects of climate change, but addressing the global challenge ultimately requires collective action of some form, such as carbon cap and trade and carbon taxes (Goulder and Schein, 2013). As has been the case with other environmental challenges including ozone depletion (Mäder et al., 2010) or sulfur oxide related acid deposition (Brady and Selle, 1985; Stavins, 1998), we might expect participation in and support for these strategies as both the scientific and general communities become more informed about climate-related risks and refuse to accept them, a pattern described as reflexive modernization (Beck, 1992). In the case of climate change, however, individuals' political ideologies and worldviews sometimes act as anti-reflexive forces, causing people to ignore risks, particularly within the United States (McCright and Dunlap, 2010). Accordingly,

climate change communication efforts aimed at encouraging climate action (e.g., driving less, support for renewable energy) must address political ideologies and worldviews in tandem with scientific knowledge (Kahan et al., 2012; McCright and Dunlap, 2011).

Climate change communicators have developed tools to navigate ideologically driven resistance to climate action, such as strategic framing (Nisbet, 2009) and the use of trusted messengers or popular icons (Moser, 2009) that are specifically designed to overcome psychological barriers to climate action. For instance, strategic framing is meant to package messages in a way that is compatible with the worldviews of receivers (Moser and Dilling, 2008; Nisbet, 2009). This technique has been successfully used in contexts such as vaccinations (Gerend and Shepherd, 2007), evolution (Long, 2011), and climate change (Nisbet and Mooney, 2007). Similarly, trusted messengers are utilized to signal that messages conform to group values (e.g., evangelical leaders talking about climate change action or evolution as consistent with conservative Christian values; Long, 2011; Wardekker et al., 2009). Although these climate change communication techniques have been successful in specific cases (Anderson, 2011; Spence and Pidgeon, 2010), polarization over climate change continues, particularly in the United States (Bolsen and Shapiro, 2018), indicating failure

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to overcome anti-reflexive forces (i.e., politically driven climate change skepticism) and the need for novel strategies.

We propose reaching adults through their children represents a productive but understudied communication pathway for climate communication. Several scholars have pointed out that because children will experience the brunt of projected mid-century impacts of climate change, there is a moral imperative to prepare future generations to address those impacts (Curren, 2007; Lombardi et al., 2016; Schlottmann, 2012). We agree with this view, and offer that child-based communication may also spur action among current adults where other strategies have failed. We suggest children may be able to overcome anti-reflexive tendencies of adults through intergenerational learning (IGL) in the context of climate change. Indeed, communication pathways through children are uniquely positioned to combat the anti-reflexive nature of adult perceptions on climate change.

2. Why is intergenerational learning so promising?

The bulk of IGL research has highlighted how older generations influence younger generations' knowledge, attitudes, and behaviors, but emerging research suggests younger generations may influence their parents' approach to a variety of controversial topics. Adults are known to influence children in a variety of ways, including student academic achievement (Davis-Kean, 2005), their approach to future marital relations (Axinn and Thornton, 1993), and the choice to stop smoking (Varcoe et al., 2010). However, as adults are more prone to anti-reflexive thinking that clouds their judgement when forming perceptions on controversial subjects (Gifford, 2011; Kollmuss and Agyeman, 2002), relying on older generations to be the teachers may be counterproductive in the case of climate change. Fortunately, recent research finds that child to parent IGL is successful in a host of contexts. Children actively influence parental grocery shopping behaviors such as the purchase of high sugar cereals (Flurry and Burns, 2005), encourage their parents to use modern technology such as computers (Baily, 2009), and are capable of changing parental views on sexual orientation (LaSala, 2000). Environmental education (EE) programs directed at children, but designed with intergenerational learning in mind, also result in the successful transfer of environmental knowledge, attitudes, and behaviors to adults. Empirical research of such programming reveals successful child to adult IGL, including waste education behaviors (Maddox et al., 2011), flood education knowledge (Williams et al., 2017), energy conservation behaviors (Boudet et al., 2016), and general environmental conservation knowledge (Leeming et al., 1997). In summary, it is clear that child to adult IGL is possible, and provides an effective avenue to environmental change that engages both younger and older generations.

Not only is child to parent IGL a proven method for reaching older generations, it is especially promising for an ideologically fraught topic like climate change for two reasons. First, children seem more able than adults to parse scientific fact from political contexts. Among adults, political ideologies and worldviews are the primary drivers of polarization around climate change perceptions (McCright and Dunlap, 2011), with education seeming to drive viewpoints farther apart (Kahan et al., 2012). However, at high levels of climate change knowledge, children reach consensus on anthropogenic climate change, regardless of worldview (Flora et al., 2014; Stevenson et al., 2014). Further, children's acceptance of anthropogenic climate change seems robust to the potential influence of denial from the adults in their lives. For instance, teachers' beliefs around the anthropogenic nature of global warming have no relationship to similar views of their students (Stevenson et al., 2016a,b), which is encouraging considering US science teachers are just as polarized on climate change as the general public (Plutzer et al., 2016; Plutzer and Hannah, 2018). Instead, if teachers accept that global warming is happening, their students are more likely to think it is both happening and human caused (Stevenson et al., 2016a,b). Although children who think their friends and family

accept anthropogenic global warming are more likely to be concerned about climate change, their own views on global warming are the strongest predictor of their concern levels (Stevenson et al., 2016a,b). This trend continues when exploring dynamics between measured (rather than perceived) climate change perceptions between children and parents, with children's climate change concern positively predicting behavior, independent of their parents' levels of concern (Lawson et al. *unpublished results*).

Second, children are likely a more trusted and ideologically neutral pathway for climate change information than other commonly relied upon sources. For example, in the content of sex education, parents reported being uncomfortable talking about sexuality generally but were more willing to talk to their children about the subject than other adults in their lives, independent of which party initiated the conversation (Morawska et al., 2015). This suggests that the bond between parent and child helps facilitate conversations around uncomfortable topics. In the case of climate change, this unique relationship between parents and children may create a context in which children may be best positioned to overcome anti-reflexivity. For example, a former US Congressman and climate change denier, Bob Inglis, noted that his son was the reason that he chose to change his climate change perceptions, and now fights for effective climate policies (Sausser, 2018). In summary, children appear to be the ideal conduit for climate change communication to their parents, as they are capable of understanding and acting on the subject more effectively than parents and are more trusted by parents than other information sources.

3. How Do We leverage intergenerational learning to combat anti-reflexivity?

At least five key principles should guide efforts to promote child to adult intergenerational learning (IGL) of climate action. *Education efforts focused on local issues* (Ballantyne et al., 2001; Sutherland and Ham, 1992), *longer term and more in depth lessons* (preferably with repeated contact, lasting a few weeks or more), *hands-on projects, enthusiastic teachers*, and *encouragement of parental participation* (Percy-Smith and Burns, 2013) encourage child to parent intergenerational learning. For instance, (Ballantyne et al., 2001) found that framing local Australian environmental issues from the perspective of Aboriginal tribes, over the course of a few weeks, promoted child to parent IGL. Because research with adults suggests framing climate change in a local context increases climate change acceptance (Moser and Dilling, 2008), using local scenarios in climate change education may be particularly useful in encouraging IGL even among skeptical parents. Similarly, Sutherland and Ham (1992) revealed that hands-on exploration of a watershed led by enthusiastic teachers, that included parental participation in the form of a workbook completed at home, resulted in successful child to parent IGL. Other IGL studies also document the inclusion of a homework component that encourages parental engagement (e.g., parental interviews) as a key for successful child to parent IGL (Ballantyne et al., 1998; Leeming et al., 1997; Uzzell et al., 1994; Vaughan et al., 2003; Williams et al., 2017).

Although observational studies suggest many of these practices may promote child to parent IGL in climate change contexts, experimental studies are needed to evaluate causality. Research on climate change perceptions in family settings indicates parents and their children share perceptions on climate change (Leppanen et al., 2012), suggesting that IGL could be occurring. Adolescent students who perceived their family members as concerned about anthropogenic climate change and discussed climate change with their families were more likely to be concerned themselves (Stevenson et al., 2016a,b) and engage in climate mitigation behaviors (Valdez et al., 2017). Similarly, children and parent engagement in climate change mitigation behaviors seems to be linked, with a parents' choice to participate in climate mitigation behaviors predicting a child's likelihood to participate in those same behaviors (Lawson et al. *unpublished results*), along with information

seeking behaviors concerning climate change (Mead et al., 2012). These studies demonstrate that parents' and children's climate change perceptions and behaviors are related, but no empirical research has been undertaken to test for directionality of influence.

Limited research on IGL, particularly in the context of climate change, may reflect challenges associated with conducting education-based research with children and in family units. Research with children is generally harder to get approved than research with adults given human subjects concerns of research review boards, and the need to secure permission from school administrators, and parents in addition to children themselves adds additional logistical barriers (Klingner et al., 2003; Swauger, 2009). Similarly, collecting data from paired groups of parents and children requires steps not typically associated with survey research, such as data collection protocols where teachers collect data from students, and students from parents. This approach invariables reduces response rates, and communication between children, parents, and sometimes teachers is difficult to coordinate (Wellington, 2015). Challenges developing equivalent and comparable instruments that both parents and children understand (Greig et al., 2012) creates another barrier to IGL research. Finally, research with adults and children is typically conducted by scholars from different fields creating a need for collaboration in interdisciplinary research teams - something long advocated for within research circles, but admittedly difficult to achieve in practice (Youngblood, 2007). These barriers may explain why research exploring IGL from children to parents that began decades ago (e.g., Sutherland and Ham, 1992) has been so slow to develop. These barriers, however, are not insurmountable. For example, studies in the fields of family exercise habits (Solomon-Moore et al., 2016), adolescent substance abuse therapy (Boustani et al., 2016), and child educational achievement (Davis-Kean, 2005), to name a few, has overcome them. Key elements include funding agencies and journals recognizing and rewarding the extra work, administrators and research institutions supporting efforts to build interdisciplinary teams needed to conduct the research.

Beyond overcoming these challenges related to IGL research, we offer several suggestions for scholars interested in contributing to this work. First, as much research around climate change communication and education focuses on behavior change (e.g., Hall et al., 2018; Ojala and Bengtsson, 2018), climate change IGL research should utilize and contribute to behavior theories. This work would build understanding of the role of IGL in predicting behavior among children and adults help discover which factors are particularly effective at fostering IGL. For instance, children may be particularly influential in activating parents' attitudes toward certain behaviors but not others (Ajzen, 1991; Boudet et al., 2016). Secondly, research is needed to understand under what contexts IGL occurs. For instance, IGL may be more common in multi-generation households (e.g., grandparents, parents & children together), among families whose children act as the primary language translators (Knafo and Galansky, 2008), or in countries outside of the United States, as the United States is unique in its political framing of climate change (McCright and Dunlap, 2011). Third, IGL research may contribute to understanding how family-level communication may contribute to community-wide change (North American Association for Environmental Education, 2017). Research directions such as these will help build the theoretical knowledge of IGL in informal education contexts, and how it can be leveraged by researchers and practitioners alike. The field of climate change education research is rapidly emerging (see Busch and Roman, 2017; Henderson et al., 2017; Hestness et al., 2011; Ojala and Bengtsson, 2018; Shea et al., 2016), including several projects prioritizing outreach strategies that bring together individuals from multiple generations (e.g., The Power of Conversation Project [ACE, 2017]; MADE-CLEAR Project [Made Clear, 2018]). We look forward to these and other researchers working to understand the potential of children to catalyze proactive responses to climate change.

Research on IGL of climate action would provide insight to a particularly promising and novel climate communication strategy as well

as dovetail with emerging efforts by younger generations to combat climate change. Although some may argue that IGL-based approaches inappropriately burden children (e.g., Thompson, 2014), both research (Stapleton, 2018), and recent child-led efforts offer a counterpoint (e.g., Wells, 2014). Although younger generations cannot vote, numerous examples show they are working toward solutions to make large political impacts. Across the United States, movements such as Black Lives Matter (Black Lives Matter, 2018) and the March for Our Lives protests (The New York Times, 2018) echo other youth-led social movements around child labor laws or civil rights (Center for Community Change, 2014). In environmental contexts, a Change.org petition on the behalf of fourth and fifth graders successfully convinced Dunkin' Donuts, Inc. to stop selling Styrofoam coffee cups on Earth Day 2015 (Wells, 2014). At the time of this paper, 21 adolescents aged 10 to 21 from Oregon are suing the United States government for failure to address climate change in the landmark court case, *Juliana v. US* (Our Children's Trust, 2018). Children's voices are also calling for solutions to environmental degradation and taking active roles in advocacy based endeavors globally (United Nations Children's Fund, 2007), including on climate change (Plan International Australia Youth Ambassadors, 2015). These examples suggest children are eager and able to take an active role in combating climate change, and are poised to transform society in ways that will be necessary to avoid the most catastrophic impacts of climate change (Center for Community Change, 2014). This change may not be smooth or immediate, but as history has shown, change can and will result from these youth-based efforts. IGL research can highlight their success and uncover ways to ensure they are given the best chance to lead us into a future that overcomes challenges posed by climate change.

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